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AGE AND HOMICIDE IN CANADA: A MULTI-LEVEL ANALYSIS

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DISCUSSION PAPER 22

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ABSTRACT

Relying on insights from routine activities or lifestyle theories of criminal victimization, we use multi-level regression analyses to examine the effects of the characteristics of victims, and context of social environments on the age distribution of victims of homicide. Multi-level analyses showed stronger effects of structural variables with increasing social distance on the victim-offender relationship. An exclusive focus on individual characteristics of homicide offenders and victims failed to explain overall murder rates since individual factors must be examined in relation to environmental features such as social change and opportunity.

INTRODUCTION

Criminal victimization rates reveal fundamental differences in the distribution of violence throughout the population. They tend to be higher for the young than for those who are older, higher for males than for females, and higher for minority ethnic groups. Recently and with some success cross-sectional studies have begun to account for these differences using age, sex, and race standardizations of homicide rates to compare levels of violence across jurisdictions (Deane 1987; O'Carroll and Mercy 1989). Researchers generally have recognized a relation between age and crime. However, there is much debate over both the explanation for the findings (Farrington 1986) and over methods for studying age, age-composition and age-specific terms.

The most commonly studied approach involves age composition (i.e. the proportion of young people in the general population) tied to crime rates (O'Brien 1989; Sheley and Smith 1988). Studies have demonstrated temporal shifts in crime rates vary with changes in age composition of the population (Maxim 1985; Maxim and Jocklin 1980). Also, routine activities research has shown relations of criminal offense and victimization rates to the social structure of states, metropolitan areas, and cities as a consequence of spatial distribution of age composition (Cohen and Felson 1979; Messner and Tardiff, 1987).

To the contrary, Wilson and Herrnstein (1985, p.145) suggest that age-specific factors have, in terms of individual characteristics of persons, a direct effect on crime. The age of offenders is typically examined in association with the prevalence of crime. Further, biosociological research uses age-specific crime rates attempting to explain variations in family homicide

(Daly and Wilson 1988a). What has been missing in this analysis of age effects on violent crime is a multi-level analysis of social structural and interpersonal (or situational) factors. In the paper that follows, we will examine the assumptions of routine activities and biosociological perspectives on age and crime in a multi-level investigation of homicide in Canada.

REVIEW OF LITERATURE

At issue in the analysis of patterns of age differences of offenders in homicide trends is a discussion of the viability of an age-crime curve invariant across time and space. Hirschi and Gottfredson (1983) argue that while crime rates may change age has a robust and direct effect on criminal behavior which defies explanation based on social factors or circumstances. Studies of offender characteristics propose an age-crime curve with low incidence in early years, a peak in the early 20's followed by a sharp decline into older years. The peak may vary but the form of the curve is generally the same (Farrington 1986). This proposition of a single pattern in the age-crime curve is challenged by Greenberg (1985) and Steffensmeier, Allan, Harer and Streifel (1989). They contend that there is considerable variation in age-crime distributions across offense types, over time, and space. The challenges to the age-crime curve, however, fail to repudiate the considerable evidence from the criminological literature which shows a connection between age and crime (Wilson and Herrnstein 1985).

The bulk of research revolves around offender behavior, but victimization age-crime curves show essentially the same patterns (Farrington 1986). For

example, Daly and Wilson (1988a; 1988b) using a biosociological perspective report congruence between age of homicide victims and offenders in their study of Canadian trends. There is an implicit assumption that age-specific characteristics may explain homicide variations in Canada. Daly and Wilson use descriptive measures to suggest homicide varies in interaction with age, unemployment and marital status. Their investigation of this phenomenon ends here, however. They concentrate their efforts on an analysis of family based murders ignoring, for the most part, other relationships. As a result, they offer the proposition that there is a greater likelihood of homicide the more distantly related the principals and that this is more likely to occur with young people (1988b). These events occur, they argue, as a result of genetic predispositions to jealously guard blood relatives while being more violent towards those unrelated to the offender.

A focus only on family members, however, leaves us with little insight into the importance of age for other relationships. Further, the analysis done by Daly and Wilson, while purporting to address the contextual elements in the environment that might influence behavior focuses only on individual characteristics of victims and offenders, leaving out important macro level indicators of the social structure in which homicide occurs. Their analysis appears to suffer like comparable work done by Wilson and Herrnstein (1985). Evolutionary approaches, Cohen and Machalek argue, can be seriously weakened by their treatment of the individual as the proper unit of analysis because it renders them "... incapable of understanding fully how populations of interacting individuals create social contexts that both facilitate and inhibit deviant and criminal behavior" (1989,

p.467). Cohen and Machalek maintain that the interactive dynamics of social systems, compared with individual traits, are themselves at least equal, and often far more potent, contributors to the behavioral choices that are made in the population (1989, p.467).

While they argue that age effects on homicide might find their origins in evolutionary explanations of expropriative behavior, they depart from Daly and Wilson and others in the biosociological tradition in their belief that these are not genetic but rather culturally based. An important part of this analysis revolves around the notion of criminal opportunity, providing a conceptualization of how cultural differences, defined through variations in life styles, can increase exposure to criminal risk. This risk is enhanced in certain age groups under different lifestyle or routine activity conditions (see Cohen and Felson 1979).

The routine activities approach (Cohen and Felson 1979, pp. 588-89) links victim and offender behaviour where direct contact, explicitly through similar lifestyles and implicitly through age dependence, will explain "predatory violations". Building loosely on the works of Hawley (1950) and Shaw and McKay (1942), routine activities theories hypothesize that regularities in behavior may predict the propensity for criminal victimization. Cohen and Felson (1979) argue that the probability of being a victim increases with the convergence in space and time of motivated offenders, suitable targets, and the absence of capable guardians. The relative frequency of daily activities both inside and outside of the home affect the likelihood that targets will be both visible and accessible to illegitimate activities.

However, where micro level analysis has been attempted, the results have not been completely consistent with the predictions of routine activities theories. Cohen, Kluegel and Land (1981) show how age in interaction with other demographic variables may approximate measures of lifestyle, but that better measures of lifestyle are needed. Miethe, Stafford and Long (1987) using data from the U.S. national crime survey also suggest that sociodemographic variables may be used as surrogate measures of routine activities. They find strong interaction effects between demographic characteristics of victims and activities that occur at night away from home but only for victimization related to property crime. Kennedy and Forde (1990) examine data from the Canadian Urban Victimization Study which includes direct measures of daily activities not available in the Miethe et al. study. Their results are consistent with routine activities theory for both personal and property crimes, with age a strong predictor of crime incidence. This is true as well in research reported by Messner and Tardiff (1985) who examine homicide in Manhattan. They find correspondence between demographic characteristics and the temporal setting consistent with the routine activities perspective. Micro-level studies, even while controlling for alternative measures of lifestyle, show a direct and inverse effect of age on victimization.

Macro level analysis focusing on offender decision making in person-to-person predatory offenses (Cohen and Felson 1979; Felson and Cohen 1980) has also been confounded by the absence of adequate measures of lifestyle (Maxfield 1987). Messner and Blau (1987)

have shown a consistent inverse and direct effect of age on criminal offending and victimization.[1]

A few studies have attempted to explain the relationship between micro and macro level phenomena in explaining the effect of routine activities on criminal victimization. Sampson and Wooldredge (1987) conclude that demographic and structural factors have the largest impact on victimization. Routine activities that do not vary by these characteristics are less important in predicting crime. While age-composition continues to show a direct and inverse relation to crime, Sampson and Wooldredge argue that certain lifestyles do lead to a greater vulnerability to crime than others. These variations in lifestyle are less important, however, than the variations in offending rates by demographic and structural characteristics such as age, sex, and urbanization. They propose that the only way to truly understand criminal victimization is to take into account both the lifestyle and the structural and demographic contexts of the urban environments in which these problems occur.

The evidence showing a connection between age composition and criminal offending is considerable. Wellford (1973) examines shifts in population size and age structure. He attributes much of the increase in recorded crime in the U.S. to changes in the proportion of high-risk offenders and victims (young persons) in

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[1] Note that the age-crime relation is usually truncated ignoring the low rate of offending and victimization of young children. Also, exclusion occurs because of the general irrelevance of measures such as employment and marital status for persons 15 years or younger.

the population. Easterlin and Schapiro (1979) suggest that relative cohort size, rather than absolute population size, has a direct influence on crime. They note that relative economic disadvantages for larger birth cohorts will indirectly explain a decline in annual fertility rates (Lyster 1974) and more importantly they hypothesize a direct effect of relative cohort size on increased U.S. homicide rates. O'Brien (1989) examines age, period and cohort effects for age-specific crime rates. He finds support for the Easterlin hypothesis for most property crimes, but not for violent crimes. Similarly, Steffensmeier and Harer (1987) show that property crime rates (but not homicide) have decreased as the baby-boom population has aged.

The variability in age-crime curves is not simply restricted to different results for different crimes. Kennedy and Forde (1990) have shown a direct relation between age composition and assault and robbery victimization. Krahn, Hartnagel, and Gartrell (1986) and Cohen and Land (1987), holding constant social structural and period effects, have found a positive relation between young populations and homicide rates. Sheley and Smith (1988) suggest that inconsistencies between national-level and local urban studies present a nagging problem for an explanation of the age-crime connection. Nevertheless, the form of the age-crime distribution generally peaks at a young age and declines fairly rapidly. Age has a greater effect on the age-crime curve than either period or cohort (O'Brien 1989).

Sampson and Groves (1989) draw attention to the perspective that Shaw and McKay (1942) have brought to the study of social disorganization and urban crime. They articulate the forces of disorganization as

including low socioeconomic status. They add to this the disruption of ethnic heterogeneity, residential mobility, family upheaval, and urbanization (Sampson and Groves 1989, p.783). The social disorganization process that comes with social breakdown has been discussed since the assumptions made by Durkheim that socially integrated communities have lower rates of crime (Williams and Flewelling 1988, p.423). The factors which can contribute to a lack of integration are well documented in the urban sociology literature (see Fischer 1975). These relate to the unsettling effects of population change (Wirth 1938), imbalances that occur through overly large age cohorts (Maxim 1985), tension that occurs in families identified through the increase in divorce (Gillis 1986), or the effect of structural changes in the labour market, through an increase in levels of female labour force participation, or unemployment (Cohen and Felson 1979).

Based on the findings reported in the research literature, we would expect to find that changes in population (Krahn et al. 1986) and household composition (Smith and Jarjoura 1988) will mediate the effect of inequality on homicide. As pointed out earlier, most research on age has not controlled for victim / offender relationship in the analysis (Williams and Flewelling 1988). Controlling for relational distance, we expect that an increase in social disorganization should have a greater effect on stranger than on more intimate homicide rates. Most importantly, the opportunities for criminal victimization should influence the effects of inequality across age groups. Where inequality is greatest, we expect a higher level of victimization. Labour market opportunities will mediate the effects of inequality on victimization. That is, the degree of unemployment may influence the effect of inequality on

homicide victimization of young persons and young children, but not older persons since they most often have retired from the labour market.

This paper will examine the age-crime curve in light of predictions from routine activities theories at the individual and social structural level. The results will also be viewed in light of suggestions made by the evolutionary or biosociological literature. The data examined will be analyzed for age dependent variations in Canadian homicide victimization using individual and aggregate level information. First, we will examine temporal and spatial variation in homicide victimizations using individual level information. Second, we will disaggregate the individual level age-crime curve based on spatial location and victim-offender relationship (see Messner and Tardiff 1985, p.245). Messner and Tardiff show how dependence on economic support by the young and decreased mobility of those who are older tend to concentrate the activities of these persons in the home.

We expect that the age curve will vary in relation to the type of location of an incident. As routine activities theories predict (Messner and Tardiff 1985), since most contacts within the home are with family members and close acquaintances, we would expect that younger and older victims will more often be victimized in private spaces (their own homes) and by persons known to them (family members). There also will be sex differences since males tend to participate in greater numbers of activities in public areas. We will describe the distribution and central tendency of each of the age-homicide victimization curves.

We expect, further, the total homicide rate to be sensitive to age-specific variations among

sociodemographic variables. Looking at both micro and macro level information, we predict that changes in family structure, relative economic disadvantage, and changes in the labour force will influence the form of the age-homicide curve. We use multi-level regression analyses to examine the influence of the characteristics of victims and features of social environments on the age distribution of victims of homicide.

MICRO-LEVEL METHOD AND MEASURES

Data Source

Statistics Canada has generated a national homicide database for incidents which occurred during 1961-83. Each police department reports to Statistics Canada via a "homicide return" which contains information about time, location, victims, offenders, offenses, and court appearances. Because both infanticide and manslaughter are only reported for 10 of the 23 years, these are excluded from the analysis. Hence, these data represent homicides, i.e. first and second degree murder, committed in Canada (excluding manslaughter and infanticide).

Age-Crime Curves

To consider the invariance proposition in the relationship between age and crime, we compare the age-crime curve at five year intervals: 1962-66, 1967-71, 1972-76, and 1977-81. This will reduce random variations in year to year estimates. The time frames are selected to coincide with the collection of the Canadian census which is the source for our independent variables. We present graphical and statistical

information on the age-crime curves to evaluate distribution and central tendency.

To test the propositions based on routine activities theories we separate age-crime curves with a focus on sex, location of offense, and victim/offender relationship. The graphs may also be separated by period. This is examined in the multivariate analyses.

Statistics Canada records location of offense as follows: victim's home, suspect's home, other private place, provincial, or federal penal institution, mental institution, public place, and other public place such as a car. We collapse the data to focus on private versus public places.

We examine the victim/offender relationship using three categories. The group with the highest level of intimacy is labelled spouse/lover. This grouping includes husbands, wives (legal and common-law) and estranged lovers or those identified as involved in a love triangle. It represents those relationships where there was likely "romantic involvement" and a good deal of intimate interaction. This is combined with a group of family members (legal and common-law) including parents, grandparents, nieces, nephews, uncles, aunts, siblings etc. The more socially distant category of friends and acquaintances make up the second category. Victims and offenders involved in business relationships, friendships, casual acquaintances or other non-kinship relationships are included. Finally, we consider strangers to include those victims and offenders who had no known domestic or other relationship and those who were involved in criminal acts (besides the homicide) and had no known relationship.

MICRO-LEVEL RESULTS

Changes over Time in Homicide and Age of Victimization

Figure 1 shows the age-specific curve for total number of homicides victimizations in Canada for 1962-81 separated into five year intervals. The greater area under each curve for successive years indicates an overall pattern of increased victimization counts over the twenty years. In total, there are about 2.7 times as many victimizations on average for 1977-81 than occurred during 1962-71, with a similar though not constant increase in total homicide rates (1981: 2.7 per 100,000 versus 1961: 1.2 per 100,000; See Lenton 1989). The relative increase in victimization rates does not drastically alter the form of the age curve.

Table 1. Comparison of Age-Homicide Distributions for 1962-81

Years	Peak Age	One-half Peak Descending	Median	Mean	Skewness	Kurtosis
62-66	23	48	35	37	0.32	-.22
67-71	24	49	33	36	0.44	-.08
72-76	23	47	33	36	0.57	.14
77-81	22	45	32	35	0.53	.05

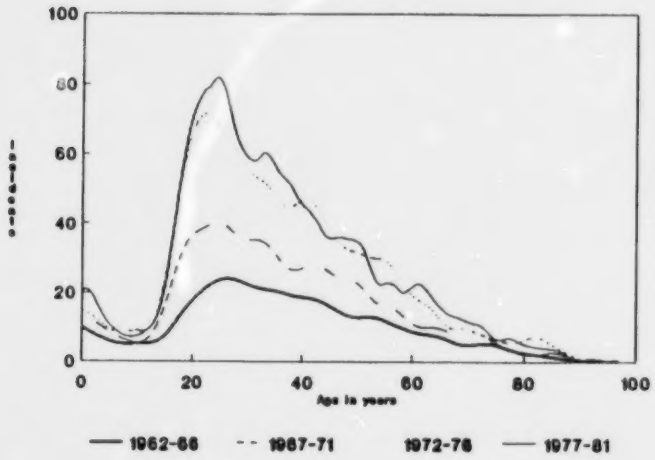

Fig. 1. Homicide Incidents in Canada by Age of Victim and Year

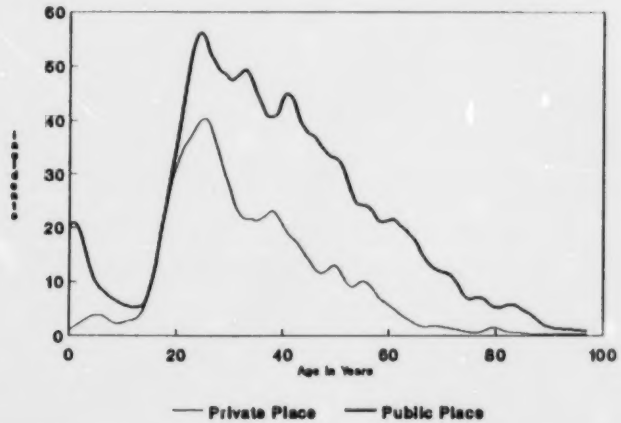

Fig. 2. Homicide in Canadian CMAs by Age of Victim and Location, 1961-83

The age curve peaks around the early 20's and declines to around one-half of peak by the late 40's. The mean, and median age of victimization (Table 1) decreases slightly from mid to early thirties. While the peak is similar, the shape of the distribution shows a marginal shift. First, the curve moves right (as reflected in positive skewness) and, second, the peak is more accentuated (as reflected in positive kurtosis) suggesting an increase in victimization risk for persons in their late teens to early twenties. In sum, these results suggest that the form of the age curve for homicide victimizations in Canada from 1962 to 1981 has undergone marginal changes to accentuate the incidence of victimization for young adults.

Location, Gender and Homicide

In considering the influence of location on age of victimization, we begin by confining our analyses to victimizations which occurred in Census Metropolitan Areas since this is the unit of analysis for the macro level variables. Routine activities theories predict (at least) a greater incidence of private victimizations for very young and older persons since they are likely to spend more time in their homes. In Figure 2, the age curves clearly support this proposition. Young children are much more often victimized in private spaces (their own homes). The curves peak around age 25, but public victimizations decline at a much faster rate (See table 2) as older persons are more often victimized in their homes.

Disaggregating the age curve by gender and location (Figure 3), noting that in Canada males are more often victims of homicide than females (Silverman and Kennedy 1987), we find that males and females are about equally often victimized in private places (as seen in the

similar distribution and tendencies of the curves), but males are much more often victimized in public places than are females (as noted in the wide separation of the curves). These results are a similar pattern to contingency tables reported by Messner and Tardiff (1985, p.254).

The data on victimizations in public places indicate a low number of incidents until the late teens with the curve peaking earlier for females (age 23) than for males (age 26). This is followed by a general decline in later years but there are differences in the male and female victimization curves. First, standardizing the curve, based on number within an age category as a percentage of total number of victims, we find that females (ages 3,4,5) are about three times as often victimized as the same group of males. Second, the

Table 2. Comparison of Victim Location, Sex, Age-Homicide Distributions for 1961-83

	Peak Age	One-half Peak Descending	Median	Mean	Skewness	Kurtosis
Public						
Male	26	36	31	34	0.69	.60
Female	23	30	24	29	1.34	2.00
Both	26	34	30	33	0.79	.90
Private						
Male	40	55	39	39	0.08	-.22
Female	25	42	34	37	0.48	.09
Both	25	45	36	38	0.27	-.13

curve for females in general shows a greater likelihood (a higher skewness) and accentuation of the curve (very high kurtosis) toward young victims, than does the curve for males (Table 2).

The age curve by sex for victimizations in private places has a much different distribution and form than the curve for public places. First, infants are more often victimized than older children. Then there is a shift in the late teens so that the curve rapidly increases in the early twenties, and finally there is a general decline in the number of incidents.

In Table 2, the mean and median age of males and females victimized in public places suggest that female victims are generally younger than male victims. The peak age for females (age 25) is much earlier than that for males (age 40) but there are several minor peaks for males as seen in Figure 3. The form of the age curve also varies by sex. The curve for males is a flat and near normal curve whereas the curve for females indicates a slight bias to young ages even though it is near normally attenuated. These patterns may reflect a bias to greater involvement of males in public activities outside the home.

Victim-Offender Relationship, Location and Age

The association between victim-offender relationship and age of victimization is presented in Figure 4. The data show a general pattern of increasing victimization until the mid- twenties, followed by a decline for older ages. The age curve for family victimization deviates from this pattern, however, with a secondary peak for very young children. The acquaintance curve is similar to the family curve, peaking at the same age

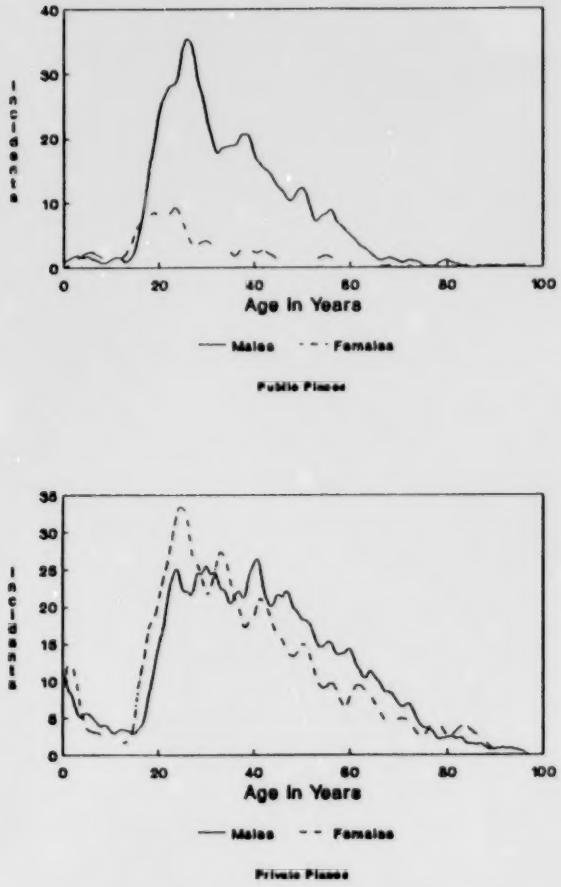

Fig. 3. Homicide in Canadian CMAs 1961-83 by Age of Victim, Location, and Sex

(see Table 3), but the acquaintance curve declines at a slower rate (based on half-life of peak). The stranger curve data indicate that persons in their early twenties are more often victimized than others, and that there is a quick decline in the curve up to age 35. This quick decline, however, levels out past age 35. Consequently, the relative distribution of stranger homicide in the age-curve is substantially over-represented for persons over age 60.

In Figure 4, separating the data based on victim-offender relationship to examine the association of location and age of the victim we find substantial variability in the age curve. Where the victim and offender are related as family members, the data clearly show victimization occurs most often in private places (homes). A similar pattern is found for acquaintance victimizations, but with proportionately fewer child victims. Finally, the stranger curve differs considerably from other relationships. Most often young people in their twenties are victimized in public, and older persons

Table 3. Comparison of Victim-Offender, Age-Homicide Distributions for 1961-83

	Peak Age	Descending One-half Peak	Median	Mean	Skewness	Kurtosis
Family	25	45	33	34	0.21	.03
Acquaintance	25	63	34	37	0.54	.07
Stranger	22	35	38	41	0.40	-.56

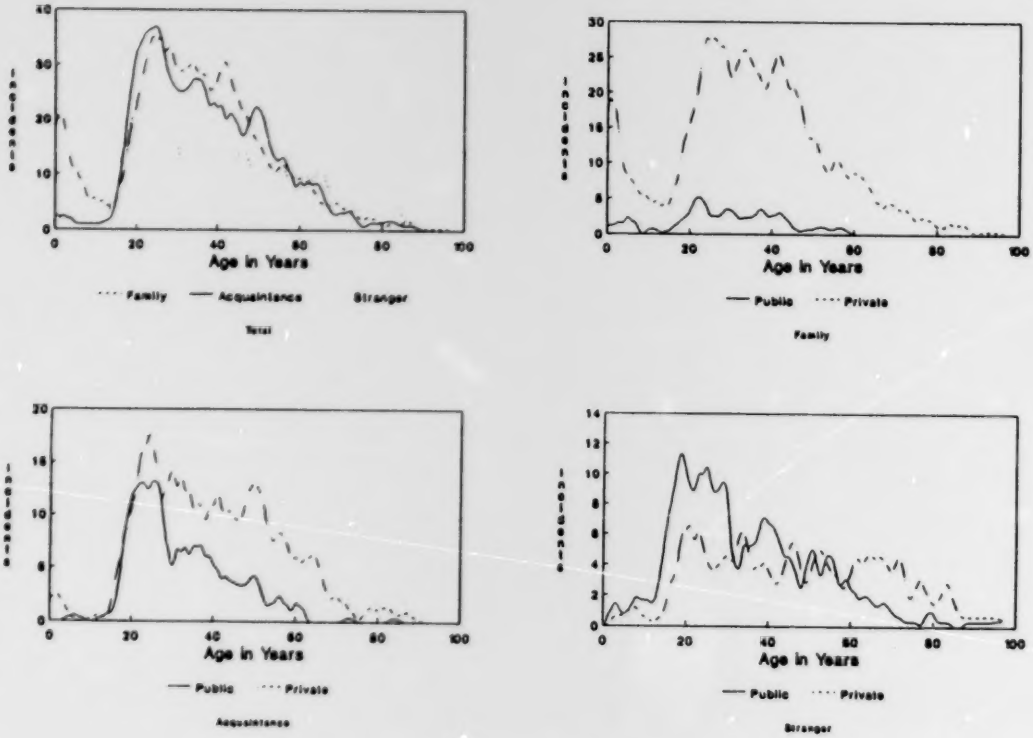

Fig. 4. Homicide in Canadian CMAs 1961-83 by Age of Victim and Victim-Offender Relationship

are victimized in their homes. The results are in the predicted direction of routine activities theories with high numbers of young persons victimized in private areas by family members, and older persons victims in their homes by both family members and strangers (See Kennedy and Silverman 1990).

In sum, we have considerable evidence to support the proposition that there is variability in the form and distribution of the age curve based on homicide victimization. How, then, do individual characteristics in combination with community-level factors influence the form and distribution of the age curve for homicide?

We can estimate the influences of social disorganization and economic deprivation in the context of age-specific homicide victimization for different types of victim/offender relationships.

MULTI-LEVEL METHODS AND MEASURES

Homicide research in the United States tends to examine state and metropolitan area based rates (Williams and Flewelling 1988). Canada has ten provinces, equivalent to states, and twenty-four metropolitan areas. We select Census Metropolitan Areas (CMAs) as our unit of analysis. These cities have a metropolitan population of greater than 100,000 as enumerated in the 1981 Census with comparable information for 1966, 1971 and 1976. Similar information is available for the ten provinces but this smaller sample would severely limit an analysis of the effect of structural characteristics on homicide victimization.

We aggregate the incident file into 5 year blocks beginning in 1962 to minimize random error in year-to-year estimates. The time frames are 1962-66, 1967-71, 1972-76 and 1977-81. The number of incidents are divided by the age-specific population in the CMA. Age groupings designated in the Census and available for each time frame are as follows: 0-4, 5-14, 15-24, 25-34, 35-44, 45-64, 65 and over. We compute average rates per 100,000 on a per-year basis.

Independent Variables

Drawing from other research, we consider variables which are related to income inequality, social disorganization, and opportunity in the comparative study of homicide. The Canadian census is the major source of these data.

The structural indicators of inequality relate to economic condition, measured through poverty indexes. We examine Gini coefficients as a measure of inequality (see Krahn et al. 1986) in income. The Gini varies between 0 and 1 with higher values indicating greater income inequality. We also include a measure of income dissimilarity with CMA family income compared to the Canadian average family income distributions.

Social disorganization relates to marital dissolution, and urbanization. Blau and Blau (1982, p.119) point out a high correlation between divorce and crime rates. Social disorganization measured through divorce adds an interpersonal dimension to our analysis of inequality. The tension created by change in economic opportunity is reflected in conflict that develops in the family, which may in time manifest itself in increased rates of violent crime. Divorce is

measured as percent divorced within the adult population (those over age 15).

In the same vein, disorganization is clearly at its highest in urban areas, especially those undergoing rapid population change (Wirth 1938; Krohn et al. 1984; Sampson and Groves 1989). The upheaval brought on by high levels of migration and the opportunity for comparison of relative disadvantage in resource allocation often bring the individuals who come into contact in these areas to violent encounters, a point reinforced by the work of Williams and Flewelling (1988). [2] Urbanization is measured here through the changes that occur in the level of population density, and population size. Migration is defined as the percentage of persons who have moved into the metropolitan area from outside the metropolitan area over the past five years.

To examine opportunity factors, we include the percent unemployment (Cantor and Land 1985), and the percent of young males age 20-34 in the population (Cohen and Land 1987).

Design

We use logistic regression analyses to estimate the structural parameters for age-specific victimization of

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[2] Of course, a strong counter argument concerning the tension encountered in cities has been offered particularly in the work of Fischer (1975). However, his arguments address the issue related to absolute size of cities versus rural areas and not to the rapid growth factors which lead to the loss of social bonds that we are addressing here.

homicide. In general, we are interested in whether the characteristics of an offender or community-level factors may explain homicide victimization for specified age groups. In particular, we are interested in whether there are differences in predictor variables which may explain the form and distribution of the age crime curve. Victimization occurs at low incidence and low rates for young children and for older persons while there are many incidents and high rates for young adults. Age of victimization is dichotomized as follows: Age1 (0-4 versus other age), Age2 (25-34 versus other), Age3 (65 and over versus other). We estimate models, controlling for victim-offender relationship (Williams and Flewelling 1988), using individual characteristics and community level factors. The individual characteristics include gender (female=1 male=0), location of incident (private=1 public=0), and marital status. The community-level variables are the overall homicide rate, gini coefficient, income dissimilarity, population, unemployment, divorce, males 20-34, and year of victimization. The relative significance of variables contributing to the model is based on a criterion that the ratio of coefficient to standard error is greater in magnitude than 1.5 (Aldrich and Nelson, 1984).

The univariate distributions of each of the structural variables is analyzed and found to have moderate degrees of skewness and kurtosis for overall population. This variable is log-transformed, base 10, to adjust for non-linearity. A second problem encountered in previous studies is multi-collinearity among predictor variables (Light 1984). The percentage of migrants and percentage divorced; and population density and population size are highly correlated. We eliminate migration, and population density from the analysis. No other correlations are above .6 which

suggests that multi-collinearity among predictor variables is not a problem for this analysis. A third problem is the low degree of variability in the gini coefficient. We drop the gini from the analysis. In accord with the previous discussion, age-specific logistic regression models will be estimated to determine which variables best explain the variation in homicide victimizatic

MULTI-LEVEL RESULTS

Age-specific Homicide Rates

In Figure 5, we present a smoothed curve of average age-specific homicide victimizations for CMAs. We find a general increase in the homicide victimization rates over the 20 years for all age groups. The general form is similar to the incidence age curve. Young children are victimized at a lower rate than other persons. Younger adults tend to be victimized at a higher rate than others. Unlike the incidence curve, where there is a fairly rapid decline in the number of victimizations after age 25 until the mid forties, there is a very slow decline in the slope of the age victimization curve so that there are only minor differences in the homicide rates of older persons and young adults.

There are temporal changes in the age-specific homicide age curve. The peak age of victimization moves from around 40 years in 1962-66 to around 30 years in 1977-81. If we accept the Hirschi-Gottfredson invariance proposition, we would expect about equally proportional increases at each stage under the age curve at each point in time. Instead, we find that young children in 1977-81 are being victimized about

200% of expected rate with 1962-66 as a baseline. This compares with 125% for older persons, and 80% of the expected rate for young adults. As a result we find a slower rate of decline of homicide rates into older age groups despite the shift of the peak of the age curve to a younger age. The proportional increase in the rate of victimization of the elderly in Canadian census metropolitan areas is contrary to the trend in Canada for this same time period where the elderly are victimized at a lower rate in 1981 than in 1971 (Silverman and Kennedy 1990).

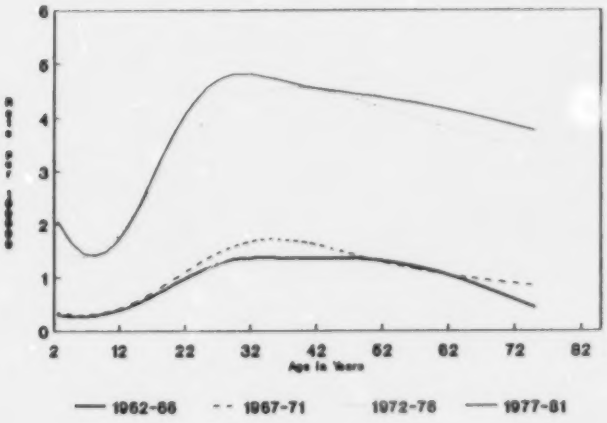

Fig. 5. Age-Specific Victimization Homicide Rates in Canadian CMAs 1962-83

An alternative test of the invariance proposition, correlations of age-specific rates with the overall homicide rate, fails to show a strong connection between homicide rates of young persons with the overall homicide rate.[3] These results, in sum, do not show a clear cut relationship between age composition and homicide victimization in Canadian CMAs. This finding does not negate but is inconsistent with previous research. Deane (1987) has suggested that overall homicide rates will be positively related to the percentage of young persons in a population. We find considerable variability in age-specific homicide rates in Canadian CMAs. It appears that the form of the age curve is related to factors other than simply the prevalence of a highly homicide-susceptible age group.

Estimated Effects

The effects of individual characteristics and social structure on the probability of being in a specified age group are estimated using logistic regression.[4] The incident file is organized to focus upon victims of homicide. We will attempt to determine if there are differences in the characteristics and social

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[3] The rates and correlation coefficients are available in tabular form but are not presented here since none of the coefficients are substantial.

[4] Marital status measures are excluded for those aged 0 to 4 years since they are irrelevant. Widowed is excluded as a category for those aged 25 to 34 years because of low incidence for this group. Data for 1962-66 are excluded since income and employment variables are unavailable.

structural variables which predict victimization within designated parts of the age curve for homicide.

First, looking at child victims up to age 4 we find that victims are significantly more likely to be female, victimized in a private place (their home), with an interaction between female and private place (Table 4). These results are consistent with results presented by Fiala and LaFree (1988).

The social structural variables indicate that there are more child homicides where the unemployment rate is lower. We also see that there is no relationship between the likelihood of being a young child and the total homicide rate. This suggests that the ages 0 to 4 section of the age curve varies independently of the overall homicide rate so that there will be variability in the form and distribution of this section of the age curve.

Disaggregating the overall number of child homicides by victim-offender relationship fails to show significant elaboration on the overall model. Generally, the models fail to converge because there were too few cases of child-acquaintance, and child-stranger homicide.

Table 4. Logistic Regression Predicting Age 0-4 By Respondents Characteristics, Routine Activities and Structural Variables, Canadian Homicide Datafile 1967-81

Independent Variable	Total	Family	Acquaintance	Stranger[1]
Gender	.910*	-.723	--	--
Private	1.374*	.377	--	--
Gender x Private	.634*	.193	--	--
Homicide Rate	-.138	-.607	--	--
Income Diss.	-.176	-.173	--	--
Population lg10	-.318	-.233	--	--
% unemployment	-.120*	-.052	--	--
% divorced	.067	-.033	--	--
% male 20-34	-.015	-.020	--	--
Year	-.120	-.020	--	--
Intercept	.460*	1.522*	--	--
Model Chi-sq	2759	925	--	--
df	2860	915	--	--

Note: *1.5 times SE

[1] Too few cases to estimate a solution. The model failed to converge.

Consider the individual and structural effects on younger adults ages 25 to 34 in Table 5. Looking at the total number of homicides, victimizations tend to occur more often outside the home, and to married individuals. The data also show that females are significantly more often victimized within their home. The model shows no significant influence of social structural variables on the level of young adult homicide.

Separating the models by victim-offender relationship the data indicate significant differences from the total model. At the individual level, both family and stranger homicides tend to occur more often outside the home and among married individuals. Stranger homicides, however, also vary so that young adult females tend to be victimized within their own home. As relational distance increases there are effects of structural context on victimization where there are lower levels of income inequality, higher population size, lower levels of unemployment, and lower percentages of young males in the population. With higher employment levels and reduced income inequality there may be greater opportunities for individuals to get out of their homes.

With greater population size there may be lower levels of guardianship as proposed by routine activities theories. The variation of homicide victimizations with a lower proportion of young males, however, goes against the proposition that a greater proportion of young males will yield a higher homicide rate. While this may be true for American studies, we find no relation between the overall homicide rate and victimization of young adults. In fact the negative relation with young males suggests the opposite to opportunity theory where a greater age homogeneity of

population will lead to increased homicide. Finally, we find a period effect so that there are decreasing levels of stranger homicide in later years.

Table 5. Logistic Regression Predicting Age 25-34 By Respondents Characteristics, Routine Activities and Structural Variables, Canadian Homicide Datafile 1967-81

Independent Variable	Total	Family	Acquaintance	Stranger
Gender	-.062	.188	.472	-.483
Private	-.363*	-.768*	.002	-.635*
Married	.196*	.336*	-.014	.434*
Divorced	.256	.329	.286	.630
GenderxPrivate	.322*	.550	-.633	.968*
Homicide Rate	.108	-.183	-.060	.160
Income Diss.	-.035	.163	-.002	-1.199*
Population	.129	-.192	-.319*	.442*
% unemployment	.014	.010	.055	-.216*
% divorced	.004	-.009	.227	.157
% male 20-34	.006	-.006	.033*	-.055*
Year	.014	.006	-.012	-.143*
Intercept	.948	-.178*	.108*	8.700*
Model Chi-sq	2871	924	780	626
df	2858	913	769	625

Note: *1.5 times SE

In Table 6, we consider the predictors of victimization of older persons. For the total model victimizations tend to occur within the home, to married or widowed persons, with no sex differences for victimization within the home. There is also a structural effect where a lower percentage of males 20 to 34 in the population is associated with higher prevalence of victimization of older persons.

Disaggregation of the total model by victim-offender relationship indicates differential effects of structural variables on victimization of older persons with increasing relational distance. Marital status (married and widowed) and a lower divorce rate significantly relate to family and stranger victimization. Location of victimization (within the home) additionally influences acquaintance and stranger victimization. The patterns of structural variables differ across relationship in that greater income inequality, and a lower proportion of males 20 to 34 significantly affect victimization by strangers. Unemployment has no effect on the prevalence of victimization of older persons. The data indicate a significant period effect with lessened numbers of family homicide in later years. These results also show that increasing social disorganization seen in higher levels of divorce, and an underrepresentation (possibly an out-migration) of young males from the population may lead to increased victimization of older persons. Together with an increasing degree of income inequality we would expect a greater number of victimizations. The data show that victimization of older persons is significantly related to the stranger homicide rate. This occurs despite the fact that most stranger homicides of elderly tend to occur in private places (the home of the victim).

Table 6. Logistic Regression Predicting Age 65 or over By Respondents Characteristics, Routine Activities and Structural Variables, Canadian Homicide Datafile 1967-81

Independent Variable	Total	Family	Acquain-tance	Stranger
Gender	.118	-.800	.548	-.354
Private	.961*	.808	1.253*	1.335*
Married	.876*	2.350*	-.001	.540*
Widowed	3.654*	4.334*	3.825*	3.480*
Divorced	-.174	-5.440	.318	-.552
GenderxPrivate	-.644*	.242	-1.179	-.160
Homicide Rate	.082	-.540	.001	1.479*
Income Diss.	-.348	-.068	-.928	1.348*
Population	-.086	.396	-.580	.178
% unemployment	.050	-.045	.116	.036
% divorced	-.160	-.474*	.392	-.394*
% male 20-34	-.042*	-.032	-.063	-.052*
Year	.018	-.172*	-.092	-.015
Intercept	3.710*	4.629	9.864*	-1.350
Model Chi-sq	2833	864	674	666
df	2857	912	768	624

Note: *1.5 times SE

Comparing the predictors of victimization of different age groups, we find that victimization of young children is less dependent upon social structural conditions than are victimizations of young adults and older persons. A disaggregation of the homicides by victim-offender relationship shows a greater influence of social structural variables with increasing social distance. Unemployment has an effect on victimization for persons aged 20 to 34 (and the total model for young children probably because their parents are in this age group), but none on victimization of older persons. Income dissimilarity varies with age so that higher inequality leads to decreased victimization of younger people and increased victimization of older people. This inconsistency may be understood taking into consideration the location of victimization and potential for guardianship within the home at each age. Young persons may be as likely as older persons to be victimized when there is greater income inequality since they both may spend a greater amount of time in their homes when unemployment is higher (keeping the younger person at home). In addition, neither potentially has much money to spend. The older person, however, is less well able to guard him or herself when a stranger commits a robbery and in the event of injury the older person may be more likely to die (Canadian Urban Victimization Survey 1985). In sum, these results suggest that the form of the age curve for homicide is most likely to be influenced by the degree of stranger homicide within Canadian cities.

SUMMARY AND CONCLUSIONS

We established with micro-level data that there is variability in the form and distribution of the age crime curve. Specifically, we disaggregated the curve

along the parameters of gender, location of incident, and victim-offender relationship. We demonstrated that the curve is sensitive to changes as proposed by routine activities theories such that the peak levels of occurrence shifts according to circumstance and the curve flattens when standardized.

We have looked at social structural and temporal distributions in murder. We identified considerable variation in age-specific homicide rates in Canadian Census Metropolitan Areas between locations and over time. We also indicated that age composition does not have a strong link to the total homicide rate. In particular, we established that homicide rates for young persons are unrelated with total homicide. This negated the proposition that there is a unitary effect of age on homicide events regardless of circumstance, consistent with an opportunity perspective of crime.

To examine factors related to age of homicide victimization, we have linked individual and social structural factors in a multi-level analysis finding a significant inverse effect of the proportion of young males in a population on the level of homicide for older persons, but not for other persons. These effects are opposite to reports in the U.S. (O'Brien 1989). We found higher homicide rates in areas where there is a lower percentage of young males. We suggest that these results are consistent with the propositions of routine activities theories (South and Cohen 1985). In particular, where opportunities for employment are restricted we would expect a greater degree of migration of young persons to areas where employment prospects are greater this may account for low numbers of young persons in an area. This is consistent with cohort explanations of crime (Easterlin and Schapiro 1979) where greater pressures on particular age groups

in a population may lead to increased violence in the community. This explanation runs counter to the suggestions of biosociological theory concerning the overriding importance of the presence of young males in explaining homicide events since a lower proportion of young males in the population is associated with homicide victimizations.

Further, again in support of routine activities predictions, the effect of age-composition is accentuated for stranger homicide particularly where there is a greater level of income inequality. This appears to support the propositions offered by Daly and Wilson (1988a; 1988b) about the importance of family relations in predicting homicide events. Stranger homicide falls under the explanation of the enhancement of expropriative behaviors occurring in instance of low resource potential, as suggested by Cohen and Machalek (1988). Part of this behavior includes actions taken against the elderly who inadvertently become homicide victims during property crimes, as suggested by research conducted by Kennedy and Silverman (1990). Under conditions of higher income inequality we would expect a greater number of potential victims with older persons less able to survive a victimization in their home.

Multi-level analyses also showed stronger effects of structural variables with increasing social distance between the victim-offender relationship. We found significant period effects with a trend toward fewer family based homicides for young adults, and an increase in stranger based homicides for older persons. The conclusion from these findings does not discount the importance of analyses of the family based homicide rate. We suggest, however, that future research should be directed at understanding the patterns of stranger

based homicide since it seems to be more directly related to changes in social context (Riedel, 1987). Where the biosociological view fails is with its exclusive focus on genetic / individual characteristics of homicide offenders and victims, to explain overall murder rates since individual factors must be examined in relation to environmental features such as social change and opportunity. The focus should instead be placed on the interrelationship between unemployment, income inequality, age, and homicide. Unemployment is a strong predictor of homicide for younger persons. This is not found for older persons. While significant for both age groups, income inequality is positively related to stranger homicide for older persons, but the opposite is the case for young adults. Furthermore, estimation of differences in opportunities while controlling for relational distance point to major variations in factors contributing to the overall homicide rate. This research provides strong support for examining routine activities patterns using both individual and contextual factors.

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